



YEAR SIX

YEAR SIX: NUMBER & PLACE VALUE

NATIONAL CURRICULUM

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit

- Round any whole number to a required degree of accuracy

- Use negative numbers in context, and calculate intervals across zero

- Solve number and practical problems that involve all of the above.

OBJECTIVES

- Explain the place value in numbers up to 10,000,000
- Order a set of numbers to 10,000,000
- Understand how a number can be partitioned into different amounts
- Multiply and divide numbers by 10 and 1,000 and explain the effect on the size of the digits in the number

- Round numbers to the nearest 1,000,000
- Estimate the answers to calculations by rounding and comparing answers

- Solve problems involving negative numbers linked to temperature, money and measures, e.g. find the difference between two temperatures when one is negative.

- Solve problems involving place value, including word problems and problems

WORKING DEEPER

- Solve logic and reasoning problems involving understanding of place value in numbers to 10,000,000

- Solve logic and reasoning problems involving rounding, e.g. guess my number with a range of clues such as, my number rounded to the nearest 10,000 is 60,000

- Solve multi-step problems involving negative numbers, e.g. give debits and credits into a bank over a week with a starting balance of £100 and an overdraft of £150

- Solve complex multi-step problems involving place value, including

YEAR SIX: ADDITION & SUBTRACTION

NATIONAL CURRICULUM	OBJECTIVES	WORKING DEEPER
<ul style="list-style-type: none"> Perform mental calculations, including with mixed operations and large numbers. 	<ul style="list-style-type: none"> Can mentally add and subtract numbers including decimals using a variety of strategies. 	<ul style="list-style-type: none"> Reason about which method of addition and subtraction is most efficient.
<ul style="list-style-type: none"> Use their knowledge of the order of operations to carry out calculations involving the four operations. 	<ul style="list-style-type: none"> Can understand and use brackets. Can understand the order of operations, BODMAS. 	<ul style="list-style-type: none"> Can make a number sentence true by completing the missing boxes while applying BODMAS.
<ul style="list-style-type: none"> Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> Can use addition and/or subtraction strategies to solve a complex problem. Solve problems including those with more than one step. 	<ul style="list-style-type: none"> Can explain the steps and methods in an addition and subtraction problem and the reasons for them.
<ul style="list-style-type: none"> Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. 	<ul style="list-style-type: none"> Can use rounding to estimate the answer. Can use estimating to consider whether their answer is appropriate. Can use the inverse to check the answer. 	<ul style="list-style-type: none"> Can use estimating to consider whether their answer is appropriate.

YEAR SIX: MULTIPLICATION & DIVISION

NATIONAL CURRICULUM	OBJECTIVES	WORKING DEEPER
<ul style="list-style-type: none"> Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. 	<ul style="list-style-type: none"> Use mental strategies to approximate answers to multiplication and division calculations Use an appropriate formal written method to multiply numbers up to ThHTU by TU 	<ul style="list-style-type: none"> Identify the calculations needed to solve a multiplication word problem involving more than one step Solve complex word problems involving multiplication Solve multiplication word problems linked to money and measures Correct a multiplication calculation completed with errors and explain reasoning
<ul style="list-style-type: none"> Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context 	<ul style="list-style-type: none"> Use an expanded written method to divide ThHTU by TU Use a standard written method of long division to divide ThHTU by TU Interpret remainders accurately 	<ul style="list-style-type: none"> Identify the calculations needed to solve a long division word problem involving more than one step Solve complex word problems involving long division Solve long division word problems linked to money and measures Correct a long division calculation completed with errors and explain reasoning
<ul style="list-style-type: none"> Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. 	<ul style="list-style-type: none"> Use a standard written method of short division to divide ThHTU by U Use a standard written method of short division to divide ThHTU by TU Interpret remainders accurately 	<ul style="list-style-type: none"> Identify the calculations needed to solve a short division word problem involving more than one step Solve complex word problems involving short division Solve short division word problems linked to money and measures Correct a short division calculation completed with errors and explain reasoning

YEAR SIX: MULTIPLICATION & DIVISION

NATIONAL CURRICULUM	OBJECTIVES	WORKING DEEPER
<ul style="list-style-type: none"> Perform mental calculations, including with mixed operations and large numbers 	<ul style="list-style-type: none"> Decide when to use a mental method, informal jottings or a written method for calculations with all four operations Identify an appropriate strategy to solve a mental calculation, e.g. calculate 24×15, then multiply 24×10 and then halve this to get 24×5, adding these two results together. Approximate effectively using rounding Derive facts involving decimals Use knowledge of square numbers to derive square of multiples of 10, e.g. 60×60. 	<ul style="list-style-type: none"> Solve inverse problems involving multiplication and division Solve missing number and "I think of a number" problems involving multiplication and division.
<ul style="list-style-type: none"> Identify common factors, common multiples and prime numbers 	<ul style="list-style-type: none"> Identify common factors of 2 digit numbers Identify common multiples of 2 digit numbers Identify prime numbers to 100 and begin to recall these 	<ul style="list-style-type: none"> Understand and use the term Lowest Common Multiple to investigate multiples Investigate prime numbers, e.g. which 3 prime numbers multiply to make 231? Use known facts and divisibility tests to identify common factors of numbers
<ul style="list-style-type: none"> Use their knowledge of the order of operations to carry out calculations involving the four operations 	<ul style="list-style-type: none"> Understand the order of BODMAS and use this to solve calculations 	<ul style="list-style-type: none"> Solve reasoning questions involving the order of operations, e.g. true or false, are these calculations equivalent?

YEAR SIX: FRACTIONS, DECIMALS & PERCENTAGE

NATIONAL CURRICULUM	OBJECTIVES	WORKING DEEPER
<ul style="list-style-type: none"> Use common factors to simplify fractions; use common multiples to express fractions in the same denominator 	<ul style="list-style-type: none"> Understand equivalent fractions have common multiples Using diagrams can see fractions are the same when simplified. Can simplify fractions by dividing the numerator and denominator by a common factor. 	<ul style="list-style-type: none"> Can identify which value is the odd one out by converting appropriately.
<ul style="list-style-type: none"> Compare and order fractions, including fractions > 1 	<ul style="list-style-type: none"> Can convert fractions into common denominators Can use decimal equivalence to order and compare fractions. 	<ul style="list-style-type: none"> Can suggest fractions to go in between two given fractions
<ul style="list-style-type: none"> Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions 	<ul style="list-style-type: none"> Use knowledge of equivalent fractions to add fractions Convert mixed numbers into improper fractions. 	<ul style="list-style-type: none"> Can identify possible missing fractions in a given calculation.
<ul style="list-style-type: none"> Multiply simple pairs of proper fractions, writing the answer in its simplest form 	<ul style="list-style-type: none"> Understand when multiplying by a fraction the answer will be smaller. Using diagrams can understand when multiplying fractions by a fraction the answer will be smaller. Can follow a standard method to multiply fractions. 	<ul style="list-style-type: none"> Can reason why the following statement is true or false: the sum of two fractions is always greater than their product.
<ul style="list-style-type: none"> Divide proper fractions by whole numbers 	<ul style="list-style-type: none"> Can divide a proper fraction by a whole number Can explain how to divide a proper fraction, using diagrams if necessary to show understanding 	<ul style="list-style-type: none"> Can reason why the following statement if this is true or false: If I divide a fraction by a whole number, the quotient is always smaller than the dividend.
<ul style="list-style-type: none"> Associate a fraction with division and calculate decimal fraction equivalents 	<ul style="list-style-type: none"> Knows how a decimal fraction to calculated from a fraction. Can recall common fraction and decimal equivalents Understand how to calculate a decimal from a fraction by dividing the numerator by the denominator. Can explore recurring equivalence of decimals and fractions. 	<ul style="list-style-type: none"> Can use a known fact to determine other decimal fractions

YEAR SIX: FRACTIONS, DECIMALS & PERCENTAGES



NATIONAL CURRICULUM

- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places

OBJECTIVES

- Understands the effect of multiplying a decimal by 10, 100 and 1000.
- Understands the effect of dividing a decimal by 10, 100 and 1000.

WORKING DEEPER

- Can explain why $2.34/10$ is the same as $23.4/100$ are the same.

YEAR SIX: MEASUREMENT

NATIONAL CURRICULUM

- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

OBJECTIVES

- Can recall approximate conversions and is able to tell if an answer is sensible.
- Can use decimal notation in a variety of formats to solve a problem.

WORKING DEEPER

- Can convert 2.3hrs into minutes

- Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places

- Can explain the relationship between conversions
- Can make estimates based on approximate conversions:
 - 1 litre is approximately 2 pints (more accurately, $1\frac{3}{4}$ pints)
 - 4.5 litres is approximately 1 gallon or 8 pints
 - 1 kilogram is approximately 2 lb (more accurately, 2.2 lb)
 - 30 grams is approximately 1 oz
 - 8 kilometres is approximately 5 miles

- Can solve problems where units of measure need to be converted more than once.

- Convert between miles and kilometres

- Can use the conversion of miles to km to apply to other facts.

- Can connect conversion (e.g. from kilometres to miles) to a graphical representation.

- Recognise that shapes with the same areas can have different perimeters and vice versa

- Can measure and calculate the perimeter and area of composite rectilinear shapes
- Can calculate the perimeters of compound shapes that can be split into rectangles.
- Can identify shapes that have the same area but have different perimeters

- Can reason about the area and perimeter of shapes, e.g. If you draw two rectangles and the second one has a greater perimeter than the first one, then the second one will also have a greater area.

- Recognise when it is possible to use formulae for area and volume of shapes

- Understands when to use a formula to find the area of a shape.
- Understands when to use the formula to find the volume of a shape.

- Can solve reasoning statements about area and volume.

YEAR SIX: MEASUREMENT



NATIONAL CURRICULUM

OBJECTIVES

WORKING DEEPER

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|---|--|---|
| <ul style="list-style-type: none"> Calculate the area of parallelograms and triangles | <ul style="list-style-type: none"> Can calculate the area of right angled triangles using their knowledge of a square or rectangle. Can generalise how to find the area of a triangle Can calculate the area of a parallelogram using their knowledge of squares, rectangles and triangles. | <ul style="list-style-type: none"> Can find the perimeter and area of a design where a mixture of shapes have been used. |
| <ul style="list-style-type: none"> Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), extending to other units [for example, mm³ and km³]. | <ul style="list-style-type: none"> Can choose the appropriate measure to find the volume of a shape, e.g. cm or m. Can compare and order the volume of different shapes using estimates. Can calculate the volume of a shape using the formula. | <ul style="list-style-type: none"> Can create a list of top tips to calculate, estimate and compare volume. |

YEAR SIX: GEOMETRY: PROPERTIES OF SHAPE

NATIONAL CURRICULUM

OBJECTIVES

WORKING DEEPER

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|--|---|--|
| <ul style="list-style-type: none"> Draw 2D shapes using given dimensions and angles. | <ul style="list-style-type: none"> Identify, visualise and describe properties of rectangles, triangles and regular polygons Use knowledge of properties to draw 2D shapes. Use a ruler to measure accurately within 1mm Use a ruler to draw lines accurately within 2mm Use a protractor to measure angles accurately within 1 degree Use a protractor to draw angles accurately within 2 degrees Construct a triangle given two sides and the included angle | <ul style="list-style-type: none"> Can solve problems using angles, such as: A triangle has been drawn carefully. You are told that the biggest angle is 20° larger than the second biggest angle and 40° larger than the smallest angle. Work out how big each angle is. |
| <ul style="list-style-type: none"> Recognise, describe and build simple 3D shapes, including making nets. | <ul style="list-style-type: none"> Identify, visualise and describe properties of 3D solids. Identify 3D shapes from their nets and explain why, including open and closed cubes Draw nets of 3D shapes with given dimensions. | <ul style="list-style-type: none"> Reason whether statements are true or false, e.g. Pascal says that any net made with six squares can be folded to make a cube. Do you agree with him? |
| <ul style="list-style-type: none"> Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons | <ul style="list-style-type: none"> Recognise the properties of isosceles, right angled, equilateral and scalene triangles. Recognise the properties of squares, rectangles, rhombuses, parallelograms, trapeziums and kites. Explain why a polygon is regular or irregular. Identify whether a triangle is isosceles from known angles and sides. Find unknown angles in all triangles, given one angle. | <ul style="list-style-type: none"> Reason whether statements are true or false e.g. Pascal says that any net made with six squares can be folded to make a cube. Do you agree with him? |
| <ul style="list-style-type: none"> Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. | <ul style="list-style-type: none"> Know that the circumference is the distance around a circle Know that the radius is the distance from the centre to the circumference Know that the diameter is 2x the radius Use the formula $C=\pi d$ to work out the circumference of a circle | <ul style="list-style-type: none"> Solve problems and reasoning questions involving circles, e.g. compare a circle and an oval. What's the same and what's different? |

YEAR SIX: GEOMETRY: PROPERTIES OF SHAPE



NATIONAL CURRICULUM

- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite. Find missing angles.

OBJECTIVES

- Estimate angles
- Use a protractor to measure and draw angles on their own and in shapes
- Know that the angle sum of a triangle is 180°
- Know that the angles on a straight line add to 180°
- Know that the sum of angles around a point is 360°
- Recognise vertically opposite angles and know that they are equal
- Find missing angles in a variety of contexts

WORKING DEEPER

- Can use unknown angles and lengths using algebra

YEAR SIX: GEOMETRY: PROPERTIES OF SHAPE

NATIONAL CURRICULUM

- Describe positions on the full coordinate grid (all four quadrants)

OBJECTIVES

- Can draw an axis for the four quadrants with equal spacing and negative numbers.
- Can describe the vertices of a shape in all four quadrants
- Can use the properties of a shape to complete the vertices of the shape.

WORKING DEEPER

- Can identify coordinates of a shape vertex after the shape has been reflected, translated or rotated.

- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

- Can draw a shape after a reflection of a simple shape in two mirror lines.
- Can draw a shape after a shape has been translated across the four quadrants.

- Can express translation using algebra, e.g. (a, b) is $(a + 2, b + 3)$.

YEAR SIX: STATISTICS

NATIONAL CURRICULUM

- Interpret and construct pie charts and line graphs and use these to solve problems

OBJECTIVES

- Use knowledge of fractions and percentages to interpret pie charts
- Construct a simple pie chart using common fractions
- Interpret a line graph when the answer lies between two given intervals
- Interpret a line graph that represents a conversion, e.g. miles/kilometres

WORKING DEEPER

- Understand the size of angles within a pie chart and link these to common fractions and percentages
- Answer problems that require interpretation of line graphs and reasoning about the best value in a real life context, e.g. which phone tariff would be best?

- Calculate and interpret the mean as an average.

- Calculate the mean of a set of numbers
- Understand that the mean is an average and understand when it is appropriate to find the mean of a set of data

- Reason about the mean amount, e.g. if the mean of 5 numbers is 35 and the range is 12, what could the 5 numbers be?

YEAR SIX: RATIO & PROPORTION



NATIONAL CURRICULUM

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
- Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.
- Solve problems involving similar shapes where the scale factor is known or can be found

OBJECTIVES

- Understands ratio as a comparison of one part or amount with another
- Can confidently use the language of 'for every' when describing a ratio.
- Can use ratio to show the relative size of two quantities
- Can investigate possible answers to a question where one fraction has an impact on the other.
- Understands proportion as a fraction of the whole amount
- Can use percentages equivalents to describe a proportion
- Understands direct proportion by scaling quantities up and down
- Understands ratio as additive change or a multiplicative change
- Can scale up/down recipes for a given number.

WORKING DEEPER

- Can use logic to solve ratio problems, e.g. purple paint is made from red and blue paint in the ratio of 3:5. To make 40 litres of purple paint, how much would I need of each colour? Explain your thinking.
- Can apply the use of proportion and ratio to other areas of learning, e.g. interpreting pie charts.
- Solve problems where a percentage has an impact on the whole number, e.g. in a class of children, 25% are boys and the rest are girls. There are 18 girls. How many children are in the class?
- Can unpick a problem, e.g. a recipe needs to include three times as much apple than peach. The total weight of apples and peaches in a recipe is 700g. How much apple do I need?

YEAR SIX: ALGEBRA

NATIONAL CURRICULUM

- Use simple formulae
- Generate and describe linear number sequences
- Express missing number problems algebraically

OBJECTIVES

- Understands a value can be replaced by a number or a symbol
- Can solve missing box calculations by using inverse.
- Can use formulae for other areas of learning, e.g. perimeter and measure.
- Can substitute values into a formulae to find an answer.
- Can show a good understanding of the equals sign
- Can create a number sequence given a rule to follow.
- Understands a linear equation can be recursive, i.e. one number in the sequence is generated from the preceding number (e.g. by adding 3 to the preceding number).
- Understands a linear equation can be ordinal, i.e. the position of the number in the sequence generates the number (e.g. by multiplying the position by 3, and then subtracting 2).
- Can use symbols to express missing number problems
- Can find values that satisfy the equation and make it a true statement.
- Understands the associative law and can apply it to missing number problems
- Understands the distributive law and can apply it to missing number problems

WORKING DEEPER

- Can write simple formulae for "I think of a number" problems and use it to solve the reason why they work.
- Can create a linear equation to describe a visual pattern
- Solve missing facts in other areas of mathematics, e.g. use the properties of rectangles and triangles to deduce related facts and find missing lengths and angles.

YEAR SIX: ALGEBRA



NATIONAL CURRICULUM

- Find pairs of numbers that satisfy an equation with two unknowns.

OBJECTIVES

- Can substitute numbers into unknowns to find a given value where there are limited answers.

WORKING DEEPER

- Can find whole number values that satisfy an equation where there is more than one possibility, e.g. I bought some apples costing 10p and some pears costing 15p. The total cost was 90p. How many apples and pears could I have bought?

- Enumerate possibilities of combinations of two variables.

- Can identify different variables and consider the impact on one when one changes, e.g. list all the combinations of boys and girls in a class where there are twice as many boys as girls and between 25 & 35 children in the class altogether.

- Can reason the impact on one value if another was to be changed.



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